APPENDIX G

SEDIMENT REMOVAL 2005,
DEAD CREEK SEGMENTS B, D AND F INFORMATION

Sauget Area 1 Time Critical Sediment Removal Action
Revised Creek Bottom Soil Removal Work Plan
Dead Creek Segments B, D, and F
Sauget and Cahokia, Illinois

Submitted To;

U.S. Environmental Protection Agency
Region 5
77 West Jackson Blvd.
Chicago, Illinois

July 27, 2005

Introduction and Background

This document serves as a revision to the Work Plan titled, "Sauget Area 1 Time Critical Sediment Removal Action Creek Bottom Soil Removal Work Plan" that was prepared and submitted to the United States Environmental Protection Agency (USEPA or Agency) by Solutia Inc. on May 17, 2004. The Work Plan was conditionally approved by the Agency on September 14, 2004. It required sampling and analyses of creek bottom soils in Creek Segment (CS)-D for polychlorinated biphenyls (PCBs) and CS-F for zinc. It also required excavation of all soils containing these constituents above the relevant risk-based concentrations (RBCs) to the water table. Site specific RBCs for the protection of fish were developed for these constituents of potential concern using sediment and fish tissue analytical results obtained during the Sauget Area 1 EE/CA and RI/FS. The site specific RBCs are summarized below:

Summary of RBCs

SVOCs	Bis(2-ethylhexyl)phthalate	0.478 mg/kg
Total PCBs		0.58 mg/kg
Dioxins		0.00051 mg/kg
Metals	Mercury	0.18 mg/kg
	Zinc	4,739 mg/kg

Excavated soils were to be transferred to a containment cell on Judith Lane and it was estimated that the soils excavated from these two creek segments would use the majority of the 19,000 cu. yd. of capacity available in the cell. The Work Plan specified that space available in the containment cell after completion of the excavations in CS-D and CS-F was to be filled with soil excavated from areas in CS-B.

The results of the sampling in CS-D and CS-F were submitted to the USEPA in a Technical Memorandum dated January 21, 2005. These results suggested that the total volume of soils that required excavation in CS-D and CS-F was in the order of 700 cu.

yd., much less than originally anticipated. This raised questions about the volume of soil that needed to be excavated in CS-B, and on January 28, 2005, the USEPA requested a sampling plan to define the areas of CS-B that contained constituents with concentrations above the RBC. The original January 21, 2005 technical memorandum was revised and submitted on February 21, 2005 in response to verbal comments received from the Agency. Additional revisions were made based on comments received from the Agency in a letter dated March 15, 2004, which was received by certified mail on March 29, 2005. The resulting Technical Memorandum titled, "Creek Segment B Sampling Plan" was revised on April 8, 2005 and submitted to the Agency.

Creek bottom soil sampling in accordance with the April 8, 2005 Sampling Plan was completed in CS-B in May 2005. The USEPA's oversight contractor, TetraTech, was present during all of the 2004 and 2005 creek bottom soil sampling activities.

Determination of the Extent of Excavation

The planned excavations are intended to remove soils that exceed the relevant RBCs for the constituents of potential concern (COPCs). The proposed excavation limits in each of the creek segments are separately discussed in the following sections of this Excavation Plan.

Creek Segment B Excavation

The 2002 creek bottom soil sampling results and the recent May 2005 results indicate that the soils in several areas of CS-B contain constituents that exceed specific RBCs. Table 1 summarizes the analytes detected during the 2005 CS-B creek bottom soil sampling, while Figure 1 shows the areas in CS-B where the measured COPC concentrations in soil samples exceed the RBC, based on the sampling results from 2002 and 2005.

During the post excavation sampling conducted in 2002, three samples were collected along the majority of the transect lines. As shown on Figure 2, the samples were typically located along the eastern and western sides of the creek bottom, as well as in the

center of the channel. These results were used to bias the sample locations during the 2005 sampling program, in that sample locations were selected on the side of the creek bottom that contained soils with COPC concentrations in excess of the RBCs.

Using the results from both the 2002 and 2005 sampling programs, where two or more samples exceed the RBCs along a transect, the full width of the creek bottom will be excavated. Where only one sample location exceeds RBCs, one half of the bottom width will be excavated on the same side as that in which the RBC is exceeded. Exceptions to this include areas where excavation limits were extended or deepened for ease of excavation and where nearby excavations could be combined into one area with similar depth (e.g., T2+25, T2+75, T6+25, etc., as shown on Figure 2). As well, the 2002 sampling results were reviewed to identify areas where COPC concentrations were close to the RBC value. Where such areas were identified, the proposed excavation limits were increased to remove this material.

Based on an average creek bottom channel width of 51 feet in CS-B, the total estimated volume of soil to be removed from CS-B will be approximately 2,000 cu. yd.

Creek Segment D Excavation

The results of the 2004 sampling effort in CS-D indicate that the PCBs detected at transect T6 in 2002 were a very localized and shallow occurrence, given that sample D4-1, located less than 20 feet away, contained approximately 0.014 mg/kg of PCBs. These results also indicate that PCB's are not present at depth in CS-D and are confined to a limited area around transect T6 at concentrations in excess of the RBC. As a result of USEPA comments, however, excavation in CS-D will extend from T5 to the downstream limits of CS-D (downstream of T6) as shown on Figure 3.

The results of the PCB analyses suggest that the area to be excavated in order to remove soils containing PCBs in excess of the RBC is approximately 20 to 30 feet wide, centered on transect T6. However, the ecological risk assessment concluded that dioxins were

also a constituent of concern in this creek segment. The sampling performed in 2004 focused on PCBs, since it was assumed that these could be used as a surrogate for dioxins in terms of defining the limits of creek bottom soil excavation. As such, none of the samples was analyzed for dioxins. Thus, it is considered prudent to excavate the soils in the stretch of creek bottom between transects T5 and T6, since it is known that the dioxin concentrations at T5 are below the RBC (see Figure 3).

In addition to the PCBs in the vicinity of transect T6, the sampling performed in 2002 also demonstrated that creek bottom soils in the areas of transects T1 and T2 contained zinc in excess of the RBC. Consequently, the soils in the reach of the creek bottom between Cahokia and Kinder streets will be excavated to a depth of one foot. This reach contains both transects T1 and T2.

Assuming a creek bottom width of 50 feet and an excavation depth of one foot, the volume of soil to be excavated in CS-D will be approximately 1,200 cu. yd.

Creek Segment F Excavation

The 2004 results confirm that zinc is present in some locations at concentrations in excess of the RBC in CS-F. The impacts are limited to 3 localized areas, with the greatest impact lying between sample stations F16 and F20, as demonstrated by the previously submitted results of the 2004 and 2005 sampling programs. All of the samples with zinc concentrations higher than the RBC were obtained in the shallow, near surface soils in the 0 to 1 foot depth range.

Referring to Figure 4, it is proposed to remove the upper one foot of soil along a reach of approximately 300 feet downstream of the bend in the creek at the location of sample number F15 (i.e., in the reach between samples F15 and F27). As well, the upper foot of soil will be removed from a section approximately 50 feet long between sample locations F5 and F7. Assuming an average channel width of 25 feet, the volume of soils excavated from CS-F will be approximately 325 cu. yd.

Excavation Methods

Excavation will be conducted using a track- or tire-mounted excavator with appropriate reach for designated excavation areas. As outlined in the May 17, 2004 Creek Bottom Soil Removal Work Plan, haul roads will be built along the tops of the banks of the various creek sectors, as needed. In CS-D, this will not be possible and the haul road will be constructed in the bottom of the creek bed. Creek bottom soils will be excavated with appropriate equipment and will be directly loaded into over-the-road, tandem axle dump trucks. Where necessary, the excavated material will be stockpiled in the creek bottom by the excavator and will then be transported to the dump trucks by a separate loader. Because of the limited width of the creek in CS-F and the fact that the excavation limits in CS-B do not extend across the entire width of the creek in most places, it is anticipated that the majority of the excavation in these two sectors can be accomplished using long reach excavators working form the creek banks. Where it is necessary for the haul trucks to traverse the bottom of the creek, the haul roads will be constructed in such a way that the trucks always travel on clean materials.

Excavation in each creek segment will be performed after standing water has been removed from the excavation areas. Excavation areas will be dried using portable pumps and the water will be pumped downstream of the work area. Measures to minimize water inflow into the work area during excavation will be put in place. These measures may include the use of temporary cofferdams in the creek or other temporary diversion methods discussed in the May 17, 2004 Work Plan.

In this context, it should be noted that groundwater was encountered essentially at the creek bottom during the 2005 sampling. This is consistent with measurements made in two shallow monitoring wells located between the disposal cell and the western creek bank. The groundwater elevation measured in these wells in the last week of June 2005 was 398 ft., as compared to an average creek bottom elevation in CS-B of between 396 and 397 ft. Consequently, even shallow excavations in the creek will be conducted beneath the water table. While groundwater inflow into one or two foot deep excavations

in silty and clayey materials can probably be managed by sumping and pumping, inflow into these same shallow excavations in sands or into the 5 foot deep excavations proposed for the reach between Transect 2+25 and 3+25 may be much more difficult to manage and could cause instability in the base of the excavation because of hydrostatic uplift. In such an event, the depth of excavation will have to be reduced and USEPA will be notified in this eventuality.

Excavation will begin at the upstream end of each segment and proceed in the downstream direction. In order to minimize downstream sediment transport during excavation, silt fence will be constructed across the creek downstream of all work areas during soil removal.

Excavation equipment and tools will be decontaminated prior to mobilizations to each creek segment and upon completion of the work. All personnel including equipment operators, laborers, samplers, oversight personnel, and other persons involved in the excavation and handling of soils will be required to have current OSHA 40 hour hazardous waste training. All work will be performed in accordance with all OSHA and Solutia EH&S requirements.

Transportation

Excavated materials will be transported to the onsite containment cell for disposal. Trucks and other hauling equipment will be used to transport the materials. All trucks will conform to the Illinois Department of Transportation standards and be placarded appropriately. Trucks used for transportation will follow routes approved by the Village of Cahokia and the St. Clair County Transportation Department.

Placement into Containment Cell

Excavated materials from CS-B, CS-D, and CS-F will be placed in the containment cell on Judith Lane. Soils will be unloaded from dump trucks at one of two unloading ramps

that exist in the cell and the excavated spoil will be placed and spread using a bulldozer. The dozer will also be used to compact the soils during placement.

Excavated materials that are too wet to be placed directly into the containment cell will be dewatered prior to placement using such methods as disking, harrowing, or stockpiling to hasten the drying process. Materials to be placed in the containment cell will be required to pass the paint filter test (USEPA Method 9095). If necessary, a solidifying agent, meeting the requirements of 35 IAC 724.41(e), will be used during spreading and compaction of the soils to ensure that the compacted materials pass the paint filter test.

Upon completion of material placement into the containment cell, the materials will be graded in a manner consistent with the proposed final grades for the containment cell and a temporary landfill cover will be installed. The temporary cover will consist of the same scrim reinforced polyethylene cover system (or approved equal) as currently exists on the cell. The temporary cover will be weighted and kept in place with sand bags.

Post-Excavation Sampling

During the sampling performed in 2004 and 2005, samples were obtained at one foot intervals of depth to a total depth of 5 feet at each sampling location. Consequently, post excavation sampling is not necessary, except in areas where the depth of excavation is equal to 5 feet. In all other locations, post excavation concentrations of COPC are available for soils in the bottom of the excavated areas.

The only other exception to this is the area to be excavated between Cahokia and Kinder Streets in CS-D. This area was not sampled in 2004 and, consequently, only surface soil data are available. Post excavation sampling will be carried out in this area.

Using this rationale, confirmation sampling will only be required in CS-B in the areas where excavation will extend to a depth of 5 feet (around T2+50 to T3+25). Confirmation sampling will also be performed in CS-B at T1+75C, T2+00C and T2+25C

since samples were not obtained in the center of the creek bottom during the 2005 pre-excavation sampling. For the remaining CS-B excavation areas, existing sample results will provide confirmation that soils containing COPCs in excess of the RBCs have been removed. It was also as agreed with the Agency that confirmation sampling for dioxins will be carried out in CS-D at T6 and in CS-F at T5. Confirmation sampling will also be required in CS-D between Cahokia and Kinder Streets.

Confirmation samples will be taken in the base of the excavated areas at a spacing of 25 feet on center. The samples will be obtained in the depth range of zero to one foot below the base of the excavation and will be analyzed for the specific COPC that exceeded the RBC at that location. In areas where PCBs are the COPC, verification samples will be field screened using immunoassay kits. However, the samples will also be sent to a laboratory for analyses using Method 8082. Field screening with a field gas chromatograph is not feasible on this site because of the excessive sample cleanup necessary to remove the matrix interferences from the organic acids present in the creek bottom soils.

Excavation Backfilling

The majority of the proposed excavation will be one foot deep. These areas will not be backfilled once excavation is complete. Rather, the creek bottom will be graded to provide transition slopes into the excavations. One section of CS-B will be excavated to a depth of 5 feet and this area will be backfilled to ensure that the creek bank remains stable following excavation. Backfill will consist of imported granular material that will be placed in lifts in the bottom of the excavation.

Creek Bank Slope Stability Assessment

Based on the proposed excavation plan in CS-B (refer to Figure 2), the area between transects T2+25 and T3+25 will be excavated to a depth of 5 feet. The bank is relatively steep in this area and the excavation will extend to the toe of the bank slope. It is deep enough to cause some concern about the stability of the creek bank in this area.

Consequently, a geotechnical subsurface investigation will be performed to verify the stability of the eastern creek bank in this area. The investigation will consist of one soil boring, laboratory soil testing, and engineering slope stability analyses. The boring will be drilled to a depth of 20 to 25 feet in the vicinity of the Metro Construction building near the crest of the eastern bank and both disturbed and undisturbed samples will be collected and sent to a geotechnical laboratory for classification and strength testing. This information will be used to evaluate the stability of the bank slope during excavation and backfilling.

Storm Water Management and Erosion Control

Storm water management and erosion control will be carried out in accordance with the "Construction Storm Water Pollution Prevention Plan, Dead Creek Sediment Removal Action Sauget Area 1" (SWPPP) Illinois EPA ID# ILD 980792006, dated November 29, 2004 which was prepared for the creek excavation work. This SWPPP details the design, implementation, management and maintenance of Best Management Practices (BMP) in order to reduce the amount of sediment and other pollutants in stormwater discharges associated with land disturbance activities.

Non-contact stormwater (rainwater that is generated outside of the containment cell) will be impounded within the creek segments and diverted around the work areas using appropriate erosion and sediment controls described in the SWPPP. It will then be channeled downstream in Dead Creek.

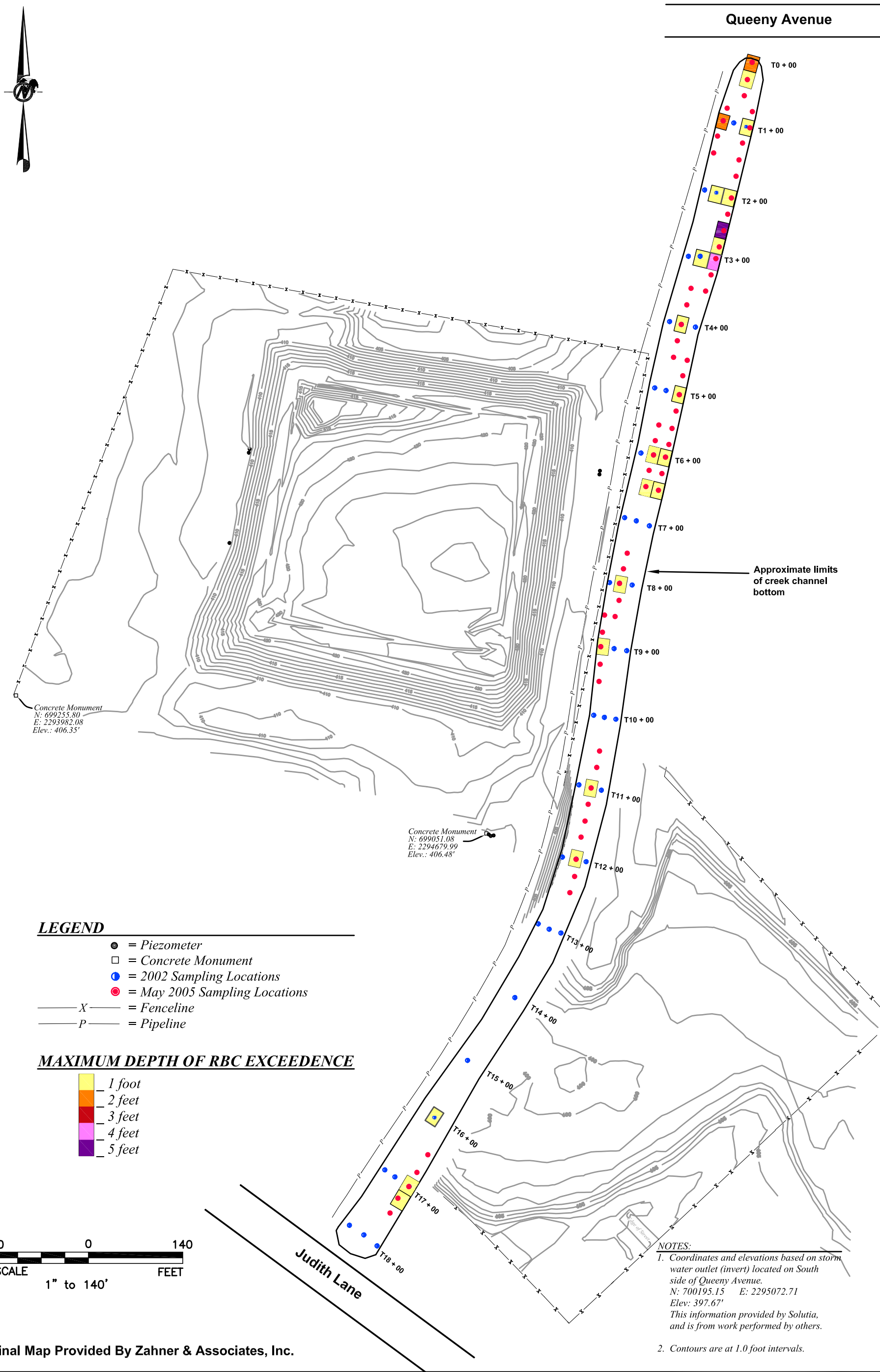
Contact stormwater (water which comes into contact with excavated soils within the containment cell) will be directed to a sump and pumped into a storage tank on site. It will then be passed through a sand filtration and activated carbon treatment system to be located onsite near the containment cell. Treated stormwater will be discharged to the southern extent of CS-B, away from excavation areas.

Areas where erosion control measures are planned are described in the SWPPP. Silt fences, straw bales, diversion dikes/ditches and cofferdams will be installed in appropriate locations around designated excavation areas.

Schedule

The schedule to complete the work proposed in this plan is tied to the approval of the plan by USEPA, as follows:

• Assessment of creek bank stability	Within 2 weeks of approval of Excavation Plan.
• Begin excavation	Within 30 days of approval of Excavation Plan.
• Completion of excavation	Within 3 months of approval of Excavation Plan.
• Submission of Completion Report	Within 30 days of USEPA Final Inspection of construction.



NOTES:

1. Coordinates and elevations based on storm water outlet (invert) located on South side of Queeny Avenue.
   N: 700195.15 E: 2295072.71
   Elev: 397.67'
   This information provided by Solutia, and is from work performed by others.
2. Contours are at 1.0 foot intervals.

Original Map Provided By Zahner & Associates, Inc.

FIGURE 1

REVIEW	CHECK	CADD	DESIGN	REV. 1	FILE No.	PROJECT No.
MNH	MNH	PGU	MNH	SCALE AS SHOWN	043967OA001	043-9670
8/26/05	8/26/05	8/26/05	7/8/05			

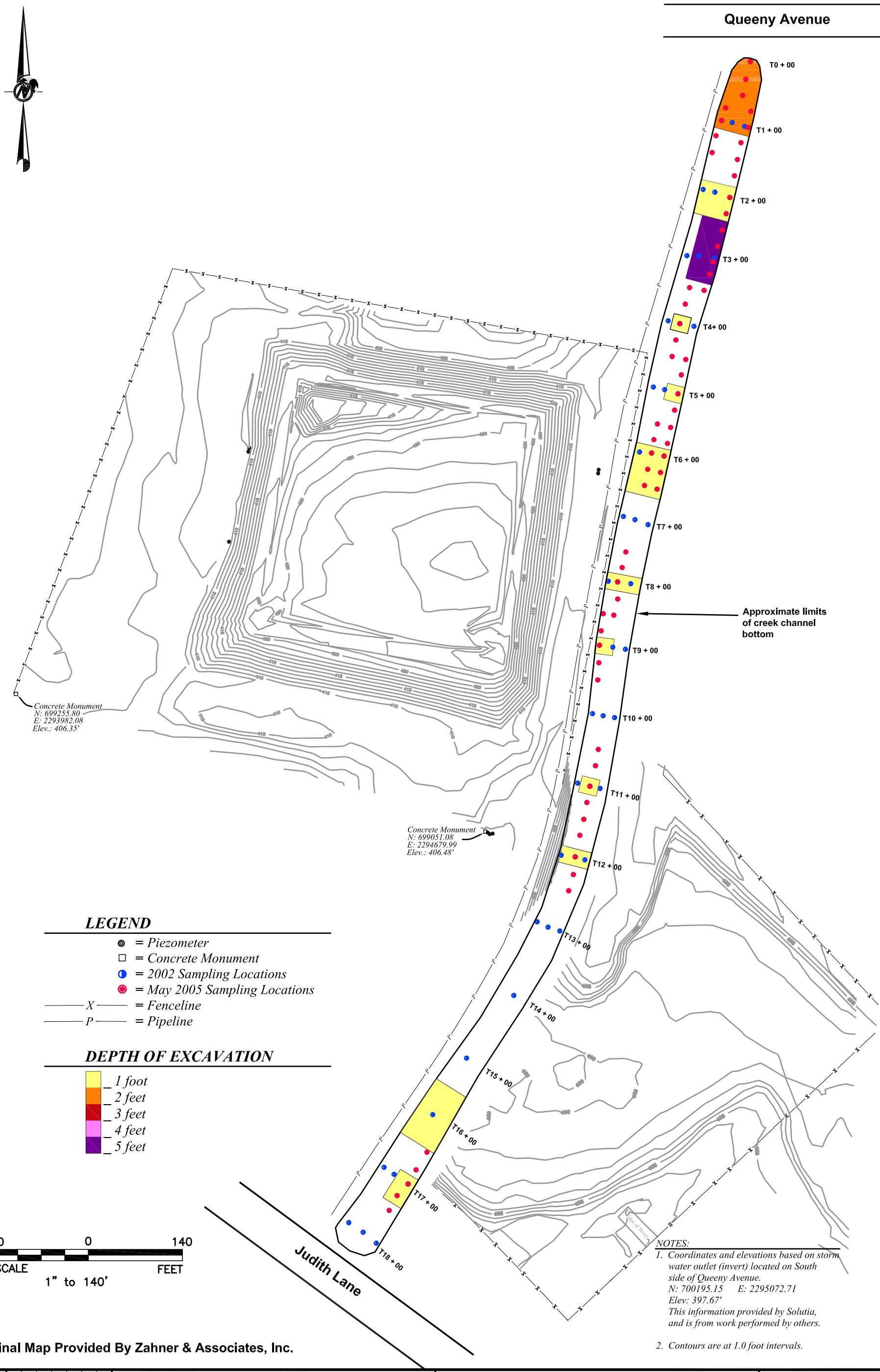
TITLE

CREEK BOTTOM SOIL SAMPLING LOCATIONS AND RBC EXCEEDENCES

PROJECT

SAUGET AREA 1
2005 DEAD CREEK SEGMENT B
SOIL SAMPLING
Sauget, Illinois

Golder Associates
St. Louis, Missouri



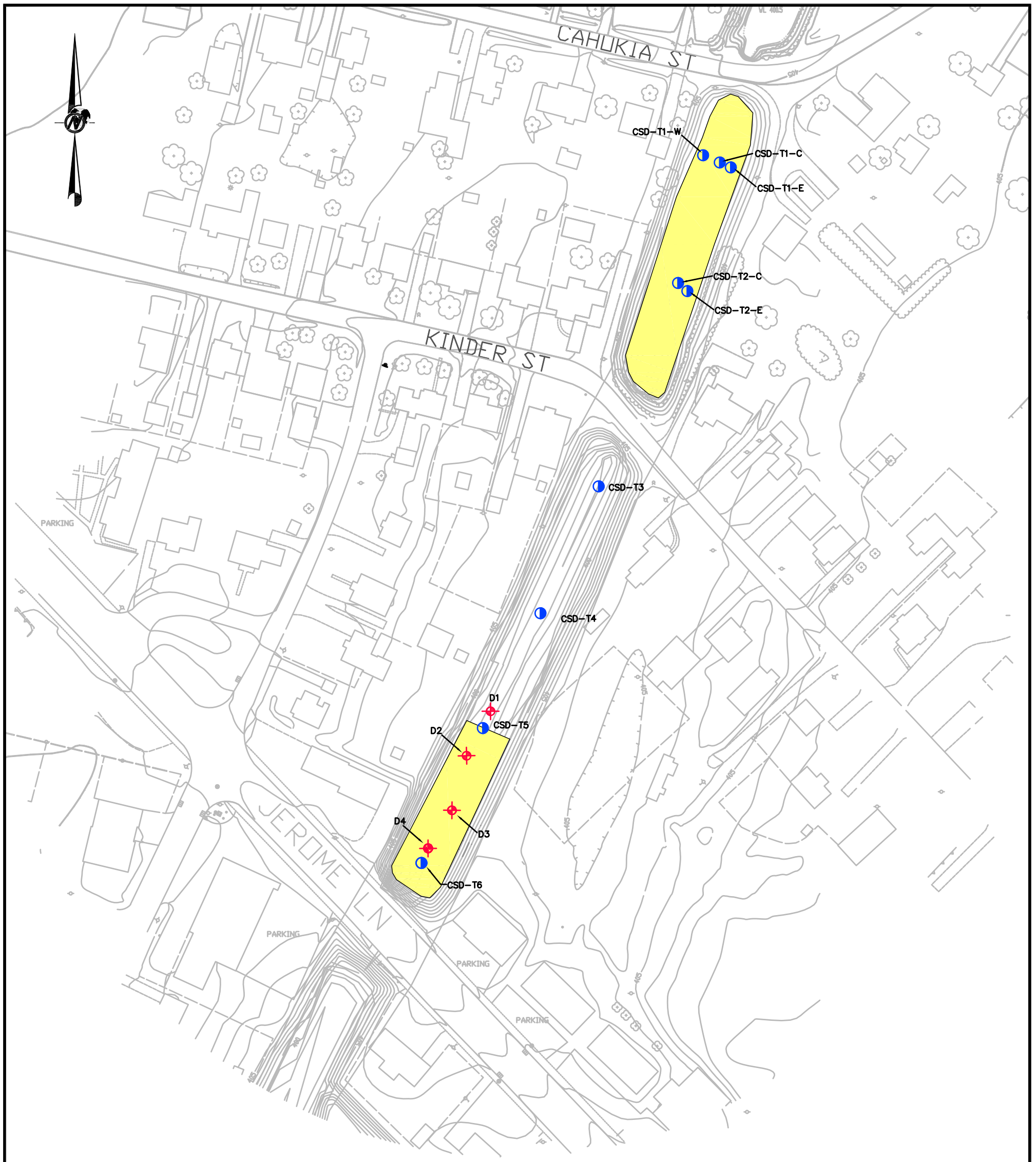
Original Map Provided By Zahner & Associates, Inc.

FIGURE 2	REVIEW MNH 8/26/05	CHECK MNH 8/26/05	CADD PGU 8/26/05	DESIGN AMF 6/30/05	REV. 1 SCALE AS SHOWN	FILE No. 0439670A002	PROJECT No. 043-9670	TITLE **DEAD CREEK SEGMENT B EXCAVATION MAP**

PROJECT

SAUGET AREA 1
REVISED CREEK BOTTOM SOIL
REMOVAL WORK PLAN
Sauget, Illinois

Golder Associates
St. Louis, Missouri



100 0 100
SCALE FEET
1" to 100'

LEGEND

◐ = 2002 Sampling Locations
⌖ = 2004 PCB Sampling Locations

DEPTH OF EXCAVATION

- 1 foot
- 2 feet
- 3 feet
- 4 feet
- 5 feet

Original Map Provided By URS Corp., Drawing "Dead Creek Segment D", 11/10/04.

FIGURE 3

REVIEW	MNH	7/20/05
CHECK	MNH	7/20/05
CADD	PCM	7/20/05
DESIGN	PCM	7/20/05
REV. 0	SCALE AS SHOWN	
FILE No.	043967OA003	
PROJECT No.		

TITLE

DEAD CREEK SEGMENT D EXCAVATION MAP

PROJECT

SAUGET AREA 1
REVISED CREEK BOTTOM SOIL
REMOVAL WORK PLAN
Sauget, Illinois

Golder Associates
St. Louis, Missouri

100 0 100

SCALE FEET

1" to 100'

LEGEND

= 2002 Sampling Locations

= 2004 Zinc Sampling Locations

DEPTH OF EXCAVATION

1 foot

2 feet

3 feet

4 feet

5 feet

Original Map Provided By URS Corp., Drawing "Dead Creek Segment F", 12/20/04.

FIGURE 4	REVIEW MNH 7/20/05	CHECK MNH 7/20/05	CADD PCM 7/20/05	DESIGN PCM 7/20/05	REV. 0 SCALE AS SHOWN	FILE No. 0439670A003	PROJECT No.

TITLE

DEAD CREEK SEGMENT F EXCAVATION MAP

PROJECT

SAUGET AREA 1
REVISED CREEK BOTTOM SOIL
REMOVAL WORK PLAN
Sauget, Illinois

Golder Associates
St. Louis, Missouri